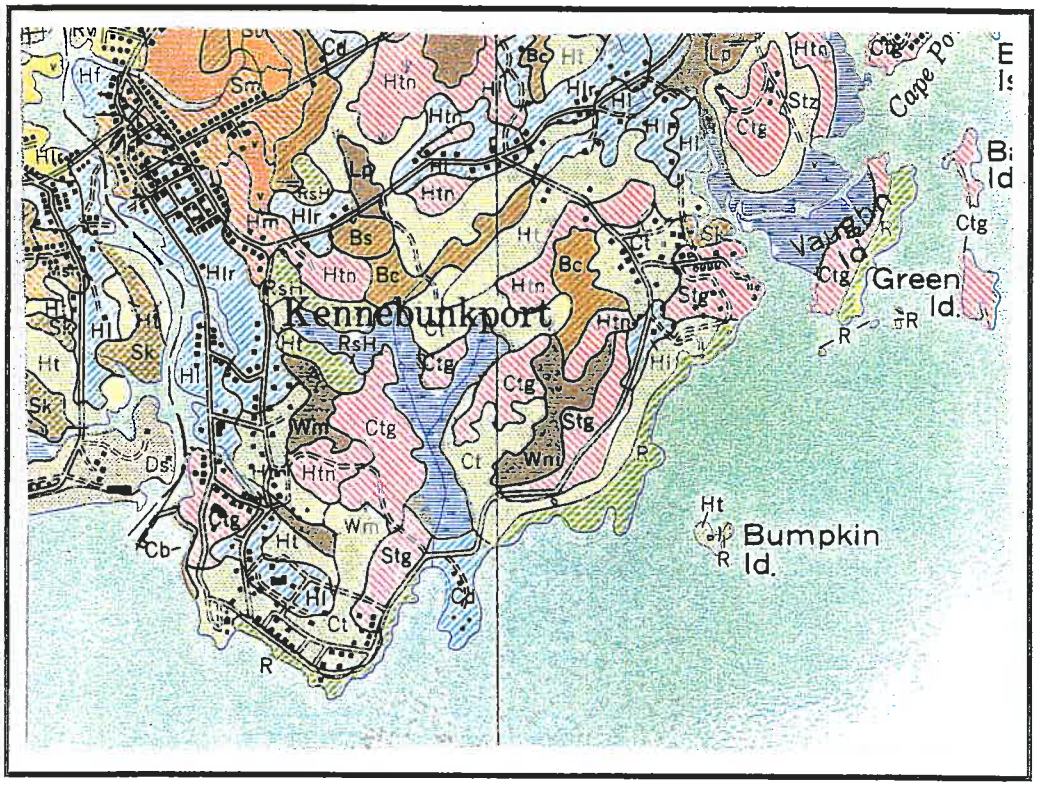
THE EARLY SOIL SURVEY IN MAINE

1910 - 1955



By: Norman R. Kalloch, Jr.
State Soil Scientist

Soil Survey of the Caribou Area, Maine
Issued July 20, 1910

by

H.L. Westover and R.W. Rowe

Letter of Transmittal

U.S. Department of Agriculture
Bureau of Soils
Washington, D.C., January 25, 1910

Sir: During the field season of 1908 the initial soil survey in the State of Maine was undertaken. Inseption of this work was urged by Prof. W.D. Hurd Dean of the College of Agriculture of the University of Maine The greater part of the important potato growing district of Aroostook County was covered by the survey.

I have the honor to transmit herewith the manuscript report and map covering this work and to request their publication as advance sheets of Field Operations of the Bureau of Soils for 1908, as authorized by law.

Very Respectively,

Milton Whitney,
Chief of Bureau

Hon. James Wilson
Secretary of Agriculture

(A reproduction of the Letter of Transmittal for Maine's first soil survey.)

The Early Soil Surveys in Maine
1910 - 1955

Introduction

The early surveys had but one purpose and that was to determine the adaptability of soils for growing agricultural crops. These surveys were the true "first generation" soil surveys and it is from these early efforts that we developed some of the landscape paradigms we still use today. Although these surveys appear crude compared to modern surveys they provided the Maine people with the first inventory of the soil resources of the State.

It was during these early years that soil science began to come into prominence and some of the soil mapping techniques taken for granted today were developed. Aerial photography was used in a Maine soil survey for the first time in Aroostook County in 1937 although it would not be until the Waldo County Soil Survey that it would be used on a county wide soil survey. Prior to aerial photos soil scientists used a plane table to create their own base map or used USGS topographic maps on which to map. The Munsell Color book had not yet been invented so these pioneers used color chip samples from the paint section from a Sears Roebuck catalogue to determine soil color. Like any endeavor someone had to be first and these men were the first in soil survey in Maine.

The pioneers of soil survey improvised as they surveyed soils since there were few established procedures for describing soils. They devised their own terms for recording soil properties. Terms like "rusty brown, rich brown mellow loam, gray smooth loam" are examples of terms used to describe soils prior to about 1950. Since there were no standards which to compare soil descriptions each soil scientist decided for himself what these terms meant.

The management and oversight in the early years of soil survey was done from a regional office. Once or twice a year a regional correlator would come to Maine and assist the soil survey party in identifying soils. Aside from these infrequent visits by the regional office the soil survey party was mostly on their own in making soil survey decisions. It was not until the 1952 when the Soil Conservation Service assumed leadership of the soil survey that Maine began to develop its own staff technical support to oversee the states soil survey program. This responsibility lasted for the next 42 years until it reverted back to the regional management of soil survey in 1994 as a result of down sizing of the federal government.

The early soil survey publications were a wealth of knowledge, not only about soils but also for what was known about agriculture of that time. In the Soil Survey for Cumberland County (1917) 12 pages are dedicated to describing the agriculture in the county. Those facts and observations about the county show how rural and how farming in Maine was, and compared to current agriculture practices how far Maine Agriculture has come since the turn of the century. Collectively, the older soil survey publications present a brief history of Maine's early agriculture.

Soil Survey of the Caribou Area, Maine

The first soil survey in Maine was the Soil Survey of the Caribou Area, Maine issued on July 20, 1910 by the Bureau of Soils. It was a 339,600 acre soil survey of Maine's expanding potato growing region in central Aroostook, County. The field work was done in 1908 by 2 soil scientists, H.L. Westover and R.W. Rowe who also were the authors of the publication. The survey was published at 1:62500 and covered what was then and still is today the center of Aroostook Counties potato farming area. A copy of this survey is available at the Maine State Library.

Until the mid to late 1800's most potatoes were consumed locally or shipped to one of the numerous nearby starch factories. It was at the time of the soil survey that the potato acreage was expanding rapidly as farmers south of Maine turned to Aroostook to grow their seed in an environment of few potato diseases. Also access to the Boston markets became easier with the availability of the railroad. The soil survey was the first land inventory that gave Aroostook farmers information on the quality of the land for growing crops.

Soil scientists, Westover and Rowe, did more than just map the soils and describe landscapes. They also offered insight to some of the attitudes people had regarding land use in the county. Apparently not everyone was interested in expanding agriculture in central Aroostook County as indicated by this comment in the 1908 publication. "It is regretted, however that large areas of good potato soils in the county are held by lumber companies and individuals, who refuse to sell them at any price and who are content with the income realized from lumber that is being removed. Land held this way is bound to check the agricultural development of the county. " There was also this editorial on how the forest was being cut at the time of the survey: "There is no present chances in exhausting the (wood) supply, however, as the owners are following a more intelligent system of cutting than was employed in the earlier days of lumbering. "

The originality of the writing in the earlier manuscripts was far different than the "just the facts" style of today. There were no guest authors to write selected parts of the manuscript. It was mainly the field soil scientists and the regional inspector writing down their observations and gathering facts and information on the climate, history, agriculture, geology as well as the soils they were mapping and studying.

There were 12 soil types mapped in the Soil Survey of the Caribou Area, Maine which were grouped into six series. They were the Caribou series, Aroostook series, Washburn series, Mapleton series, Chapman series, and Easton series. There was also one miscellaneous area - Muck. Caribou, Washburn, Mapleton, and the Easton soils have been active soil series for over 90 years! The Caribou soil is still recognized today as the best soil for growing potatoes in Aroostook County.

Caribou was recognized as having several important characteristics for being the best soil for agricultural crops including: the ability to dry out quickly after a rain and the spring thaw, the lack of large stones and boulders and its occurrence in large contiguous areas. The Caribou was the only series mapped to have multiple soil types mapped including the Caribou silt loam, Caribou gravelly loam, and Caribou stony loam.

Early soil scientists recognized the remnants of what must have been the albic, spodic and organic horizons exposed by the effects of tillage on newly cleared land as reflected in this statement, "A freshly plowed field of the Caribou loam presents a mottled appearance of snowy

white, brown and black areas." Nearly all such features have been destroyed from the many years of tillage and erosion.

It is especially significant that some of the first laboratory data on Maine soils is presented in the "Soil Survey of the Caribou Area, Maine." Mechanical analysis of the major soils is the only data presented in Maine's first soil survey. The following table is an example of this soil data.

Mechanical analysis of Caribou loam

Number	Description	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay
18688	soil	3.0	8.5	4.6	11.0	10.0	50.9	16.5
18689	subsoil	4.2	8.9	4.1	10.0	9.4	47.6	15.8

The landscape position of the Washburn soil was considered to be an intermediate between Caribou and Muck. The publication describes how a Muck soil can be transformed into a Washburn soil. A low depression of Muck removed of forest growth resulted in the soil drying out and as result of continued cultivation organic matter decreased but the amount of earthy material remained the same over time resulting in the gradual change to Washburn soil.

The final paragraph of the soil report recognizes the positive aspects of the Aroostook farmer and also gives a little advise on how to improve their land by good rotations and the use of organic matter - the same message that is still given today by agronomists and conservationists. "The farmers in general are very prosperous. They have substantial buildings, warm barns and good horses. As a rule they practice up to date methods of farming. They could however, improve their land and decrease their fertilizer bills by keeping more livestock and by following a three year rotation of potatoes, grain and clover."

Soil Survey of the Orono Area, Maine

The second soil survey in Maine is of the Orono area entitled Soil Survey of the Orono Area, Maine was issued October 3, 1910, less than 3 months after the Soil Survey of the Caribou Area was issued. The Bureau of Plant Industry, Soils, and Agricultural Engineering in cooperation with the Maine Agricultural Experiment Station. The only known copies this author is aware of are on file at University of Maine at Orono and at the Maine State Library in Augusta.

This 269,960 acre rectangular area in central Penobscot County included the towns shown on the Bangor and Orono topographic Quadrangles of that time. The field work was completed in one field season apparently by one soil scientist (Ora Lee, Jr.). Only the Bangor series and the Orono series were mapped. (Authors note: and we think we have wide ranges on some of our soils!). The Bangor series included all the soils derived from glacial till regardless of drainage or firmness of the till. The Bangor series was divided into several soil types: Bangor sandy loam, Bangor loam, and Bangor stony loam.

The Orono series was derived from stratified drift and covered the greater part of the level plain. The Orono series was divided into 5 soil types: Orono gravely sandy loam (sandy and gravely outwash), Orono fine sand (sandy outwash), Orono fine sandy loam (sand over clay deposits), Orono silt loam (silty solum over a silty clay substratum), and Orono silty clay (silty clay throughout).

The text of this survey states "The Orono silt loam is the best soil for farming however it is frequently intermixed with the Orono silty clay. These soils are hard to separate because of their variability. The better natural drainage accounts for the chief difference between the two soil types."

The other 3 mapping units are: peat, muck and rough stony land. Rough stony land included all land not suitable for cultivation. Many areas are steep and hilly and others are more level and covered by large stones.

Soil Survey of the Aroostook County Area, Maine

The Soil Survey of the Aroostook County Area, Maine is the third oldest Maine soil survey and was published by the Bureau of Soils in cooperation with the Bureau of Plant Industry within The Department of Agriculture in 1921. The area mapped was essentially the cultivated areas in Aroostook County excluding the St. John River Valley west of Van Buren and encompassed 697,600 acres. The mapping was published on two sheets, one of the northern area and the other of the southern area. The author has a reproduction of the publication but not the soil survey sheets. These must have been a small scale as the soil survey was only on two published maps.

This publication describes soils common to the area with many of the soil names still used today. Caribou, Washburn, Easton and Linneus are familiar names. There are also other soils that have long been correlated into modern soil series. Keegan, Aroostook, Van Buren, and Chapman are some of these now extinct soil names that are described in the publication. The brief descriptions describe 2 of the soils this way:

> "The Chapman loam is not a clearly defined type, but rather a mixture of 2 or more soils that could not be mapped separately. It is usually made up of well drained hummocks interspersed with poorly drained bodies." and
>
> "The Linneus silt loam occurs in the southwestern portion of the survey area. It is the only dark soil in the area which is not poorly drained. It is apparently in part glacial and in part of residual origin."

This soil survey is significant as it is most likely to have been the first survey in Maine that describes the morphology and origin of Aroostook County soils. No attempt is made to classify these soils. Likewise there are no technical descriptions of the soils but only brief non-technical descriptions that describe soil texture as it changes with depth. The text is 44 pages and notably of the 44 pages eighteen describe the survey area, its climate and economy. The soil report concludes in this fashion:

> "The area on the whole is in very prosperous condition. The homes are substantial and many are lighted with electricity. Practically all are equipped with telephones. Rural mail delivery service is available to all the farms. Most of the farmers have automobiles, and trucks and tractors are coming into use. The latest improved machinery is used for preparing the land and planting and harvesting the crops. The surplus potato crop is handled in large storage houses built especially

for this purpose. The draft stock used in farm operations is probably as fine as can be found in the country."

Erosion and Related Land Use Condition on the Presque Isle Demonstration Project, Maine

Parts of Central Aroostook were mapped for the third time in 1937. It was included in a publication called the Erosion and related Land Use Conditions on the Presque Isle Demonstration Project, Maine. The project area comprised 30,912 acres in parts of the towns of Presque Isle, Fort Fairfield and Caribou, the most highly concentrated potato growing section in the county. This project was designed to demonstrate methods to control soil erosion. One of the first steps undertaken was to make a soil conservation survey that included an inventory of soil types occurring in the area, and the type and degree of existing erosion in relation to the present land use. On the basis of the physical features inventoried by the conservation survey, conservation plans were developed for local farmers. This project resulted in the third generation soil survey for the central Aroostook area. W.B. Oliver was the Senior Soil Scientist. Later, "Bart" went on to become State Conservationist in Maine.

The inventory data were collected at a scale of one inch to 500 feet or 10.5 inches to the mile and then generalized and published at a scale of 4 inches to the mile. The soil survey information was not shown in the traditional sense but was displayed on the maps using a connotative code that represented, soil type, erosion, and slope. Land use was also cartographically shown on the planimetric maps. It is interesting that the field work was done on aerial photographs and published in a planimetric format. This possibly was the first soil survey in Maine to use aerial photos for collecting field data.

The soils in the "Presque Isle Demonstration Project Area" are described in the Appendix to the report. Most soils have been classified using the 1937 classification system. As with the earlier soil survey there are no representative pedon descriptions only a brief description defining each of the soils. A number of soils not recognized in the 1921 survey occur in the legend. Examples of these new soils series include: Presque Isle, which is similar to Caribou but with "considerable amount of foreign material of granite and igneous matter incorporated in the parent material"; Houlton, a shallow till over limestone "not used extensively for potatoes because of the tendency to scab due to the alkaline reaction of the surface soil. "; Doyle, a soil developed on glacial outwash terraces that is a somewhat droughty soil; Parkhurst, developed on sandy kame terraces and eskers in the Aroostook River valley; and the Maysville, "a silt loam imperfectly drained alluvial soil closely associated with the Aroostook soils."

It appears that the soil survey done for the "Presque Isle Demonstration Project Area" were part of a national initiative to sell conservation to farmers. By documenting the eroded condition of the soil resource the Soil Conservation Service stimulated interest in erosion control and encouraged farmers to organize Soil Conservation Districts in accordance with state law.

Soil Survey of Cumberland County

The Soil Survey of Cumberland County was the fourth survey to be completed in Maine by the Bureau of Soils. The field work was completed in 1915 and was published in 1917. It was the first county wide soil survey. Field work was done by Cornelius Van Duyne, soil scientist in charge and M.W. Beck. It is interesting that it only took one year to map this 545,920 acre survey! There were 10 series embracing 21 soil types (map units) and 4 kinds of miscellaneous

materials mapped in the county. The survey was published on single folded topoquad base map at 1:62500.

The Gloucester and Whitman series were the only soils mapped that were developed from glacial till. The Whiteman represented the poorly drained soils and the Gloucester series all the other glacial till soils regardless of soil depth, or firmness of the till.

The Orono series established in the Orono Area soil survey continued to be used in southern Maine. "The drainage (of the Orono Series) varies from good in the rolling areas to imperfect in the more level sections (of the county). The Orono series included soils derived from marine and glacial lake deposits. It most likely be comparable to the Buxton and Lamoine of today.

The Suffield series was first used in Maine in the Cumberland County survey, however, it was far different from the Suffield mapped in later surveys. At that time it was described as poorly drained and was often found in association with the better drained Orono soils. The soil types (as they were called at that time) ranged from a sand to silty clay loam but all were underlain by silty clay loam sediments.

The section on Agriculture mentions that there had been a loss of 6 percent of the counties farms between 1880 and 1910 and that only 5,131 farms remained in Cumberland County. The remaining farms covered 71 percent of the total area of Cumberland County at that time. Today, Cumberland County is Maine's most urban County. It is further noted that farm labor was mainly local and plentiful. In 1909 $25 to $35 per month with board was the average price for farm hands.

Soil Survey of York County

The Soil Survey of York County was the last survey to be completed under the leadership of the Division of Soil Survey, Bureau of Plant Industry, Soils and Agricultural Engineering Agricultural Research Administration, of the United States Department of Agriculture. After 1952 the Division of Soil Survey was transferred to the Soil Conservation Service. The York County soil survey started in 1936 and was completed in 1939 and published in 1952.

Leadership for the project provided by K.V. Goodman a soil scientist for the Division of Soil Survey. Oversight for the soil survey was by W.J. Latimer, Senior Soil Scientist from the Regional Office. The field soil scientists were D.B. (Del) Lovejoy and J.R. Arno employees of the Maine Agricultural Experiment Station and S. Von Day of the Soil Conservation Service. John Arno later became a soil scientist for the Soil Conservation Service and worked on numerous surveys during his career. Von Day became an SCS District Conservationist and later retired as an RC&D Coordinator in Aroostook County, John Arno's salary his first year was $1,200 (personal communication).

The York county soils were mapped using a Plane Table. This meant that the soil scientists had to make their own base map showing roads, buildings, waterbodies and other cultural features before they could begin delineating soils. The soil information was recompiled onto a non-photographic base map and published at a scale of 1:31680. Besides being identified by an alpha code the map units were grouped according to parent material. The soil information was published as 4 maps each being a whopping 20" x 48 inches!

The York County Soil Survey was the first Maine Survey to have typifying profiles as part of the manuscript format. The survey was primarily done for agricultural uses as the interpretations

so reflect. It would be another 10 years before soil surveys would be used extensively for making urban interpretations. Many of the soil series used in the York County Soil Survey were eventually determined to belong to the mesic temperature regime once soil Taxonomy was adopted. The current York County soil survey uses mostly frigid soils.

Like the soil surveys already discussed, the York County Soil Survey also contains dated information of interest not directly related to the soil survey. The following paragraph reinforces what we now take for granted but at the time the survey was made it seemed important enough to mention in the "Cultural Development and Improvement" section of the publication.

> "Modern lighting has lengthened the reading hours of many and several distribution lines supply ample current to all parts of the County. With the introduction of new lines and the establishment of commercial rates for heavy rural users, more and more farms are installing electric equipment. In 1940, 1,581 farms were lighted by electricity and 1,195 had telephones.

Soil Survey of Waldo County, Maine

In 1955 the Soil Survey of Waldo County, Maine was published. The mapping was done in two years (1939 - 1940) by the same soil scientists that worked on the York County Soil Survey - K.V. Goodman in charge, J.R. Arno, D.B. Lovejoy and S. Von Day and correlation and inspection by W.J. Latimer. John Arno was now receiving $1800 annually (personal communication) as a soil scientist for the Maine Agricultural Experiment Station.

It is interesting to note the time lag between the completion of the field work and the publication date. In the case of Waldo County it was 15 years and for York County it was 13 years. The modern day record for waiting for a publication is 10 years for the Hancock County Area, Soil Survey.

The Waldo County Soil Survey came at a time of reorganization of the soil survey program at the national level. The field work was done and the manuscript was prepared while the Division of Soil Survey was part of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration. It was transferred to The Soil Conservation Service on November 15, 1952 - 3 years prior to the Waldo publication.

The Soil Survey of Waldo County was the first survey in Maine to utilize aerial photography as a mapping base thus eliminating the use of a Plane Table. The survey was still recompiled to a base map without a photo base from US Geological Survey topographic quads. Nine soil maps covered the County at a scale was 1:31680 were included with the report.

The publication followed the format of the York County Soil Survey report published 3 years earlier. Also, as with the York Survey many of the soils mapped would eventually be considered to occur in the mesic regime in areas south of Maine.

An attempt to correlate poor soils and poor people is made in the Cultural Development and Improvements section of the Waldo report:

> About a third of the farms have soils below normal in crop yielding ability. On such farms the houses may be run down and poorly

furnished, and fences and equipment are often poor. Some remote areas, as around Fyre Mountain have been entirely abandoned because the soils are ledgy and unfavorable to crops.

Summary

The Waldo County Soil Survey represents the last of the first generation soil surveys that has been updated and subsequently re-published. There are first generation soil surveys in Maine that are still being used. They include: Penobscot County Soil Survey, Androscoggin and Sagadahoc Counties Soil Survey, Kennebec County Soil Survey, and Somerset County Soil Survey, Southern Part.

The southern part of Penobscot County Soil Survey first issued in 1963 has been approved for an update. This will most likely be the last published soil survey in Maine to be completely remapped. Reduced staff and soil survey budget will dictate the need for more efficient ways to make soil maps in the coming years. Future updates of older published soil surveys will probably be done through sampling techniques including the evaluation of statistically selected transacts and if needed the existing soils will be correlated to new soil map units. Future soil surveys however will build on the knowledge of the cadre of soil scientists who produced the first soil maps in Maine during the past 90 years.

Maine Soil Scientists
1910 - 1998^

Name	Position	Surveys
Westover, H.L.	Soil Scientist	Caribou, Area - 1910
Rowe, R.W.	Soil Scientist	Caribou, Area - 1910
Lee, Ora	Soil Scientist	Orono, Area - 1910
Hurst, Lewis A.	Soil Scientist	Aroostook Area - 1917
Knobel, E.W.	Soil Scientist	Aroostook Area - 1917
Hendrickson, B.H.	Soil Scientist	Aroostook Area - 1917
Van Duyne, Cornelius	Soil Scientist	Cumberland County - 1917
Beck, M.W.	Soil Scientist	Cumberland County - 1917
Oliver, William B.	Senior Soil Scientist	Presque Isle Demonstration Project 1941
Frutchey, C.W.	Soil Scientist	Presque Isle Demonstration Project 1941
Atkinson, C.H.	Soil Scientist	Presque Isle Demonstration Project 1941
Carter, R.L.	Soil Scientist	Presque Isle Demonstration Project 1941
Simmons, W.L.	Soil Scientist	Presque Isle Demonstration Project 1941
Goodman, Kenneth V.	Project Leader	York County - 1952 Waldo County - 1955 Penobscot County - 1963
Lovejoy, Delmar B.	Soil Scientist	York County - 1952* Waldo County - 1955* Penobscot County - 1963*
Arno, John R.	Project Leader	York County - 1952* Waldo County - 1955* Penobscot County - 1963 Aroostook County, NE - 1964 Aroostook County, S - 1964 Somerset County, Southern Part - 1972
Von Day, Snyder	Soil Scientist	Waldo County - 1955 Penobscot County - 1963 Kennebec County - 1978
Riley, Richard M.	Soil Scientist	Penobscot County - 1963 Cumberland County - 1974 Knox/Lincoln Counties - 1987
Whitney, Bruce A.	Soil Scientist	Penobscot County - 1963 Somerset County, Southern Part - 1972
Hall, Wayne E.	Soil Scientist	Knox/Lincoln Counties 1987

LaFlamme, Kenneth J.	Assistant State Soil Scientist	Penobscot County - 1963 Cumberland County - 1974 Kennebec County - 1978 Hancock County Area N/P
Hardesty, J.S.	State Soil Scientist	Penobscot County - 1963 Aroostook County, NE - 1964 Aroostook County, S - 1964
Worcester, Bruce	Soil Scientist*	Penobscot County - 1963 Androscoggin/Sagadahoc Counties - 1970
Willey, Rosyln	Soil Scientist	Aroostook County, NE - 1964 Somerset County, Southern Part - 1972 Androscoggin/Sagadahoc Counties - 1970 Cumberland County - 1974 Kennebec County - 1978
Farley, William H.	Soil Scientist	Aroostook County, NE - 1964 Somerset County, Southern Part - 1972
McEwen, Bryce W.	Soil Survey Project Leader	Aroostook County, NE - 1964 Androscoggin/Sagadahoc Counties - 1970 Kennebec County - 1978
Wilson, K.P.	Soil Scientist	Aroostook County, NE - 1964
Backer, A.D.	Soil Scientist	Aroostook County, NE - 1964
Faust, Albert P.	Soil Scientist	Aroostook County, NE - 1964 Androscoggin/Sagadahoc Counties - 1970 Knox/Lincoln Counties - 1987 Kennebec County - 1978
Lavoie, Oscar L.	Soil Scientist	Kennebec County - 1978
Michaels, Sheldon	Soil Scientist	Aroostook County, NE - 1964 Cumberland County - 1974 Kennebec County - 1978
Bither, Roy A.	Soil Scientist	Aroostook County, S - 1964 Somerset County, Southern Part - 1972
Lavoie, O.L.	Soil Scientist	Androscoggin/Sagadahoc Counties - 1970
Bingham, Lee	Soil Scientist	Androscoggin/Sagadahoc Counties - 1970
Hedstrom, Gary T.	Soil Survey Project Leader	Cumberland County - 1974 Waldo County - 1984 Knox/Lincoln Counties - 1987 Washington County Area - N/C Franklin County Area and Part of Somerset County N/P Piscataquis County, Southern Part - N/P
Lewis, David	Soil Scientist	Cumberland County - 1974
Steuputis, Walter J.	State Soil Scientist	
Babcock, Richard D.	State Soil Scientist	Waldo County - 1984
Ferwerda John A.	State Soil Scientist	

Joslin, Robert	Assistant State Soil Scientist	
Clark, Donald O.	Soil Scientist	Waldo County - 1984 Washington County Area - N/C Hancock County Area - N/P
Crane, J. Peter	Soil Scientist	Waldo County, 1984
Nelson, Dana F.	Soil Scientist	Waldo County, 1984
Nelson Sandra	Soil Scientist	Waldo County, 1984
Popp, David J.	Soil Scientist	Waldo County - 1984 Knox/Lincoln Counties 1987, Oxford County Area - 1995, Washington County Area N/C
Polchopek, Walter	Soil Scientist	
Titcomb, Edward P.	Soil Scientist	Waldo County - 1984
Flewelling, Lawrence R.	Soil Survey Project Leader	York County - 1982 Piscataquis County, Southern Part - N/P
Lisante, Robert H.	Soil Scientist	York County - 1982 Oxford County Area - 1995
Miller, Jonathan W.	Soil Survey Project Leader	York County - 1982 Oxford County Area - 1995
Hughes, Paul A., Jr.	Database Manager	York County - 1982 Oxford County Area - 1995 Franklin County Area and Part of Somerset County N/P Piscataquis County, Southern Part - N/P
Krall, Lisa	Soil Scientist	Franklin County Area and Parts of Somerset County - N/P
Durgin, Dennis	Soil Scientist	York County - 1982
Butler, Theordore H. Jr.	Soil Scientist	York County - 1982 Knox/Lincoln Counties 1987 Piscataquis County, Southern Part - N/P
Grisi, Brian F.	Soil Scientist	York County - 1982 Piscataquis County, Southern Part
Bailey, Manley H.	Soil Scientist	Knox/Lincoln Counties 1987 Hancock County Area - N/P
Hoar, Wayne D.	Soil Correlator	Knox/Lincoln Counties 1987 Washington County Area - N/C Franklin County Area and Part of Somerset County N/P Piscataquis County, Southern Part - N/P
Jordan, Glendon B.	Soil Survey Project Leader	Knox/Lincoln Counties 1987 Washington County Area - N/C Hancock County Area - N/P

Wilkinson, David E.	Soil Resource Specialist	Knox/Lincoln Counties 1987 Oxford County Area - 1995 Washington County Area, N/C Hancock County Area - N/P
Hersey, Paul D.	Soil Scientist	Knox/Lincoln Counties 1987
Kalloch, Norman R., Jr.	State Soil Scientist	Oxford County Area - 1995
Baldwin, Robert	Soil Scientist	Oxford County Area - 1995
Belz, David J.	Soil Scientist	Oxford County Area - 1995
Dearstyne, David A.	Soil Scientist	Oxford County Area - 1995
Savage, Patrick J.	Soil Scientist	Oxford County Area - 1995
Slabaugh, James D.	Soil Scientist	Oxford County Area - 1995
Olson, Ronald	Soil Resource Specialist	
Hodgman, Lindsay	Soil Scientist for Digitizing	
Lee, Susan E.	Soil Scientist	Washington County Area N/C Piscataquis County, Southern Part - N/P
Sullivan, Kevin L.	Soil Scientist	Franklin County and Part of Somerset County - N/P
Allen, William J.	Soil Scientist	Franklin County and Parts of Somerset County - N/P
Nelson, Frank L.	Soil Scientist	Franklin County and Part of Somerset County - N/P
Cormier, Janet Engles	Soil Scientist	Piscataquis County, Southern Part N/P
Dewall, Al	Soil Scientist	Piscataquis County, Southern Part N/P
Law, Lloyd	Soil Scientist	Piscataquis County, Southern Part N/P
Turcotte, David	Soil Survey Project Leader	

N/P – not published

N/C - field mapping not complete

- -- soil scientists employed by the Maine Agricultural Experiment Station

^ This list represents soil scientists listed as contributors to published soil surveys. It may not include other soil scientists that may have mapped soils in Maine on a limited basis.

A PART OF THE CENTRAL AROOSTOOK SOIL CONSERVATION DISTRICT, MAINE SOIL SURVEY LEGEND DATED, SEPTEMBER 3, 1943 ALONG WITH SOME OF THE FIELD NOTES THAT RESULTED FROM THE 1943 PROGRESS INSPECTION.

LEGEND
CENTRAL AROOSTOOK SOIL CONSERVATION DISTRICT, MAINE

Field Name and No.		Suggested Name	Note
SOIL LEGEND			
Limestone Till			
115	Caribou gravelly loam	Caribou gravelly loam	1
114	Caribou loam	Caribou loam	
110	Caribou silt loam	Caribou silt loam	
101	Mapleton shaly silt loam	Mapleton shaly silt loam	2
105	Mapleton gravelly loam	Mapleton gravelly loam	
103	Mapleton stony silt loam	Mapleton stony silt loam	
200	Houlton silt loam	Houlton silt loam	3
206	Houlton stony loam	Houlton stony loam	
125	Presque Isle gravelly loam	Presque Isle gravelly loam	4
215	*Creasey gravelly loam	Creasey gravelly loam	5
216	Creasey stony loam	Creasey stony loam	
	Imperfectly drained		
130	Conant silt loam	Conant silt loam	6
	Poorly drained		
140	Easton silt loam	Easton silt loam	7
150	Washburn silt loam	Washburn silt loam	8
160	Chapman silt loam	Chapman silt loam	9
163	Chapman stony silt loam	Chapman stony silt loam	
	Mixed Calcareous and Acid Shale		
	Well Drained		
272	*Perham gravelly silt loam	Perham gravelly silt loam	10
261	*St. Agatha shaly silt loam	St. Agatha shaly silt loam	11
260	St. Agatha silt loam	St. Agatha silt loam	
263	St. Agatha stony silt loam	St. Agatha stony silt loam	
	Imperfectly drained		
290	*Daigle silt loam	Daigle silt loam	12
293	Daigle stony silt loam	Daigle stony silt loam	
	Poorly Drained		
360	Monardo silt loam	Monardo silt loam	13
363	Monardo stony silt loam	Monardo stony silt loam	
370	Burnham silt loam	Burnham silt loam	14
373	Burnham stony silt loam	Burnham stony silt loam	
163	Chapman stony silt loam	Chapman stony silt loam	
	Acid Shaly till		
	Well Drained		
415	Macomber gravelly loam	Macomber gravelly loam	15

416	Macomber stony loam	Macomber stony loam	
420	*Plaisted silt loam	Plaisted silt loam	16
422	Plaisted gravelly silt loam	Plaisted gravelly silt loam with 401	17
400	*Bradbury silt loam	Bradbury shaly silt loam	
401	Bradbury shaly silt loam	Bradbury stony silt loam	
403	Bradbury stony silt loam	Rough stony land, Bradbury soil material	
403R	Rough stony land, Bradbury soil material		

NOTES:

1. The Caribou soils are well drained, intermediate in depth, derived from interbedded more or less calcareous till or resting on limestone and calcareous shales. Practically all of the Caribou gravelly loam was mapped as Caribou loam in the Soil Survey of Aroostook Area, 1917. In the text of the report it is described as having from 25 to 30 percent of gravel. This is essentially a gravelly soil and should be mapped so. However, some areas will fall far below this percentage of gravel and should be mapped a loam texture. Areas of definitely silt loam texture were noted on the inspection trip. These areas will not be extensive but should be mapped where found. The loam textures will contain more gravel than the silt loam. A gravelly silt loam should not be mapped, but if found, should be thrown with the gravelly loam.

2. The Mapleton soils are shallow Caribou; they are developed from glacial material laid down on alternate beds of limestone and calcareous shale, and have better underdrainage than the shallow till soils developed over dense calcareous or acid shales. The soils indicated in legend as St. Agatha in this and St. John Soil Conservation Districts, and Thorndike in Southern Aroostook Soil Conservation District, are developed mainly on calcareous shales which are dense in structure and do not have the aeration of the Mapleton.

3. The Houlton soils are developed upon pure limestone and are comparatively shallow but variable in depth. Wherever this condition is found, even in areas mapped in the Presque isle Project (ME-D-1) as Caribou stony loam or Mapleton stony loam, the soil should go as Houlton stony loam; that is, all comparatively shallow soils from pure limestone should be considered Houlton. This does not include soils in which this overburden, although resting upon limestone, is of mixed origin and not as alkaline as the Houlton.

4. The Presque Isle is the deep till associate of the Caribou which contains a considerable amount of calcareous material, evidenced by the fact that the substratum will effervesoe with HC.

5. The Creasey soils are developed from till derived from red calcareous sandstone and conglomerate.

6. The Conant is an imperfectly drained soil with hardpan, associated with the Caribou soils. Is calcareous in C material.

7. Easton is the poorly drained gray surface soil associated with the Caribou or belonging with the Caribou catena.

8. Washburn is the dark surface, poorly drained soil of the Caribou catena. The Easton and Washburn soils may extend into the poorly drained areas of the Perham catena, replacing the Monarda and Burnham, if and where these areas are calcareous enough to go with the Easton and Washburn.

9. There seems to be a place for the Chapman in the wooded low areas, to map a complex of Easton and Washburn and smaller areas of any associated soil. The Chapman can be mapped in association with the Caribou catena or Perham catena.

10. Perham is the equivalent of the Caribou in the mixed calcareous and acid shale belt, which lies west of the limestone belt.

11. St. Agatha is the equivalent of the Mapleton in the mixed calcareous and acid shale belt, and is the shallow soil associated with the Perham.

12. Daigle is the imperfectly drained, hardpan soil associated with the Perham soils. It is not as calcareous as Conant.

13. Monarda can be used for the gray surface soil associated with the Perham soils.

14. Burnham can be used for the dark soils in association with Perham if these soils are neutral to mildly alkaline, if strongly alkaline, use Washburn. Chapman can be used for a complex of Easton and Washburn or Burnham, and small areas of other included soils.

15. Macomber is the medium depth till from acid material.

16. Plaisted is the deep till podzol soil resembling Bernardston otherwise. Is acid to bottom of till.

17. Bradbury is a shallow glacial soil from acid shales, podzol. Is mainly a shaly silt loam in texture.

18. The Squapan is the imperfectly drained soil of the Macomber catena, having a hardpan.

19. Wallagrass is the gray surface, poorly drained soil of the Macomber catena. The Mansfield dark surface phase.

20. The Cyr is a complex of Wallagrass, Mansfield and Squapan, occurring mainly in wooded areas where separations would be extremely difficult.

21. Jemtland is the shallow till soil developed on the highly metamorphosed and altered shales occurring in association with the trap and rhyolite instrusions and flows.

22. The Isolation soils are medium depth till derived from trap, rhyolite, calcareous sandstone and shale. A shallow phase has been added.

A 1943 CATENA DIAGRAM OF THE

SOILS MAPPED IN AROOSTOOK COUNTY

SOILS OF AROOSTOOK COUNTY, MAINE, SOIL CONSERVATION SERVICE

	WELL DRAINED			IMPERFECTLY DRAINED	POORLY DRAINED	
	Shallow to rock	Medium depth	Deep Till		Gray Surface	Dark Surface
Glacial till upland Calcareous till mainly from local shale and limestone	Mapleton	Caribou	Presque Isle	← Conant	Chapman (complex) Easton	→ Washburn
Calcareous till and partly residual on glacial-swept limestone	Houlton					
Acid till mainly from underlying acid shale and slate	*Bradbury	Macomber	*Plaisted (compact)	← *Squapan	Cyr (complex) *Wallagrass	→ Mansfield
Till mainly from underlying intermittent acid & calcareous shale, slate, and in places limestone. Podzol soil -	*St. Agatha	*Perham	?	*Daigle	Easton or *Monarda	Washburn or Burnham
Same except Brown soil (Southern Aroostook District only)	Thorndike	*Benedicta	Bangor	Dixmont	*Monarda	Burnham or Washburn
Red calcareous sandstone	←	*Creasey	→	Conant	Easton	Washburn
Trap rock		*Colbath				
Trap, shale, sandstone, etc.		*Isolation		*Isolation, imp. drained ph.		
				← Chapman (complex)		→
Dark calcareous shale and limestone	Linneus shallow ph.	Linneus →		Linneus, imp. drained ph.	→	← Washburn
Granite	Canaan	Hermon		Peru		Whitman
Granite, shale and slate (Yellowish, friable till)		*Danforth		*Squapan	*Wallagrass	Burnham if mildly alk. Mansfield if acid
				← *Cyr (complex)	→	

Revised 6-10-42 W.J.L.

THE PERHAM SERIES WAS FIRST PROPOSED AT THE

1943 PROGRESS INSPECTION ON THE CENTRAL

AROOSTOOK SOIL CONSERVATION DISTRICT SOIL SURVEY

PERHAM SERIES

The Perham soils are developed on medium depth till from acid and calcareous shale material. Gravel consists of quartzite. Solum acid; mildly acid to neutral in C horizon. Is not as good as the Caribou soils, which they resemble, but are better than the Macomber, which is developed upon acid shales and sandstone. Well drained, friable, weak podzol to well podzolized. Bedrock consists of alternate beds of acid and calcareous shales, with calcareous shales predominating.

I. Soil Profile: (Perham gravelly silt loam)

1. Dark organic matter; 2 to 3 inches thick.
2. Gray mottled silt loam (podzol); 2 to 3 inches thick.
3. Rich brown mellow silt loam; 3 to 6 inches thick.
4. Yellowish-brown firm but friable silt loam; contains some shale chips; 6 to 12 inches thick.
5. Yellowish-gray slightly compact till; contains much shale material. 6 to 8 inches thick, at about 3 feet below surface. 6.0 pH.
6. Greenish-gray raw till contains much dark shale; compact; 1 to several feet thick. 7.0 pH.

II. Variations: Till ranges from 3 ft. to 12 ft. or more in depth. Contains few erratics. Gravel ranging from 20 to 35%, composed mainly of fragments of shale and some quartz or sandstone – somewhat rounded gravel.

III. Topography: Gently to strongly sloping to gently rolling.

IV. Drainage: Well drained.

V. Natural Vegetation: Beech, yellow birch, hard maple, balsam (few) popple.

VI. Use: Potatoes, oats, buckwheat, crimson clover, timothy and red clover

VII. Distribution: Northeastern Maine.

Catena: St. Agatha, Perham, Daigle, and Monarda.

Type Location: Perham, Aroostook County, Maine.

Series Proposed: Central Aroostook S.C. Dist., Maine, 1942.

Types Mapped: Perham grv. loam

Perham grv. silt loam

WJL
8-26-43

Division of Soil Survey Bureau of Plant Industry, Soils, and Agricultural Engineering U.S. Department of Agriculture